PHSC 1001 **Physical Science I** **Lec. 3 Lab. 0 Cr. 3**

Effective Date: Summer 2005-2006

Course Description

Prerequisite: Eligibility for MATH 1021. A non-technical survey course covering a broad range of topics in the field of chemistry and physics. It is not intended for students who wish to pursue further work in chemistry or physics, and may not be substituted for basic courses covering these areas of science.

Course Objectives

Students will:

1. Understand the basic concepts of the metric system and the dimensional analysis method of problem solving.
2. Understand the general concepts of chemistry (matter, the periodic table, chemical bonds, chemical equations).
3. Understand the electromagnetic spectrum and how it can be used to determine chemical and physical properties of distant stars.
4. Understand basic laws of motion and gravitation.
5. Understand the basic principles of sound.
6. Become aware of the historical dimension of the topics addressed.
7. Appreciate the role of technology in the application of and advancement of scientific knowledge.

Procedures to Evaluate these Objectives

1. In-class problems after concept presentation
2. In-class exams
3. Cumulative final exam

Use of Results of Evaluation to Improve the Course

1. Student responses to in-class problems will be used to immediately help clarify any misunderstandings and to later adjust the appropriate course material.
2. All exams will be graded and examined to determine areas of teaching which could use improvement.
3. All evaluation methods will be used to determine the efficacy of the material presentation.

Detailed Topical Outline

1. Weights and Measures
    a. Origin of Early Units
    b. Weights and Measures in the United States

c. The SI (Metric System)
d. The Dimensional Analysis Method of Problem Solving

2. Elements and Compounds
   a. Elements (Names and Distribution)
   b. Subatomic Parts and Structure of the Atom
   c. Energy Levels of Electrons
   d. Atomic Numbers - Mass Numbers - Atomic Weights
   e. Electron Structure
3. The periodic Table of the Elements
   a. Early Attempts to Classify the Elements
   b. Arrangement of the Periodic Table
   c. Periods and Groups
   d. Representative and Transition Elements
4. The Hydrogen Spectrum
   a. Electromagnetic Radiation
   b. Refraction and Reflection
   c. Emission and Absorption Lines
   d. Ground State, Excited State, and Ions
5. Chemical Bonds
   a. Valence Electrons
   b. Energy Shells, Sub-Shells, and Orbitals
   c. Ionization and Ionic Bonds
   d. Binary Compounds, Predicting Formulas
   e. Covalent Bonds
   f. Polyatomic Ions
6. Chemical Equations
   a. Writing and Balancing Equations
   b. Types of Chemical Equations
7. Types of Chemical Compounds
   a. Reactions of Acids
   b. Reactions of Bases
   c. Salts
   d. Introduction to pH
8. Physical Laws
   a. Newton's Laws of Motion
   b. Universal Gravitation
   c. Kepler's Laws
9. Nuclear Chemistry
   a. Properties of Alpha, Beta, and Gamma Radiation
   b. Nuclear Fission
   c. Nuclear Fusion
10. Sound